REMARKS

INTRODUCTION

In accordance with the foregoing, no claims have been amended. Claims 1, 3, 5, 6, 8, 10 and 13 are pending and under consideration.

CLAIM REJECTIONS

Claims 1, 5, 6, 10 and 13 were rejected under 35 USC 103(a) as being unpatentable over Pott (US 5,992,142) (hereinafter "Pott '142") in view of Pott (US 6,164,064) (hereinafter "Pott '064") and Ito et al. (US 6,378,297) (hereinafter "Ito).

Claims 3 and 8 were rejected under 35 USC 103(a) as being unpatentable over Pott '142 in view of Pott '064 and Ito and further in view of Yokota et al. (US 6,269,634) (hereinafter "Yokota").

Independent claims 1, 6 and 13

The Office Action addressed independent claims 1, 6 and 13 using the same portions of the relied upon art. The same format is used below, specifically using the claim language of claim 6.

Claim 6 recites: "...a catalyst activation control operation means for executing a control operation for activating said catalyst metal immediately before said rich-burn operation is performed ..." The Office Action relies on Pott '142 to show this feature of claim 6.

It is respectfully submitted that Pott '142 only discloses no more than two controls of "a first set of operation condition (a normal control operation means)" and "a second set of operation condition (a rich-burn control means)." See Pott '142, 4:53-5:2. In other words, it does not disclose the controls done by the "catalyst activation control operation means" as recited in claim 6.

Specifically, by referring to the control flow diagram shown in Figure 4 of Pott '142, the "REGENERATION=OFF" of step 23 is the "first set of operating condition" and the "REGENERATION=ON" of step 27 is the "second set of operation condition."

In Pott '142, in step 28 "<LAMBDA RICH", refers to when the air/fuel ratio λ becomes smaller than the prescribed value during the carrying out of the "second set of operation condition" of step 27, it is assumed that regeneration of the accumulator (NOx occlusion-reduction type catalyst) 7 is occurring, and the regeneration period is counted in or by step 29.

Then, with the step 28 of Pott '142, where ">LAMBDA RICH," when the air/fuel ratio λ is larger than the prescribed value, the control returns to step 21 while the "second set of operation condition" is carried out and simply a time interval is allowed until the air/fuel ratio λ becomes smaller than the prescribed value. See Pott '142, 12:4-12:12.

Accordingly, it is respectfully submitted that in either the illustration of the control flow of Figure 2 in Pott '142 or the description pertinent to Figure 2, there is no showing of the control by a "catalyst activation control operation means" as recited in claim 6.

Claim 6 further recites: "...performing a catalyst activation control operation by said catalyst activation control operation means when it is judged by said regeneration control initiation judging means that a regeneration control for the regeneration of the NOx occlusion reduction type catalyst is to be initiated..."

In contrast to the assertion made in the Office Action, it is respectfully submitted that in Pott '142, starting of regeneration of NOx occlusion-reduction type catalyst is controlled not by the "step 22 with YES answer" as noted in the Office Action, but by "step 26 with ≥ *v* REGENERATION", i.e. "step 27'. Also, initiation of rich-burn control operation is controlled not by "step 28 with < LAMBDA RICH" but by "step 26 with *v* REGENERATION (step 27)." See Pott '142, 12:1-12:4.

Claim 6 further recites: "...wherein in the course of said catalyst activation control operation, a burning control operation in the vicinity of the stoichiometric air/fuel ratio in the range of 0.8 to 1.1 in terms of an excess fuel factor is performed in the condition of the EGR valve being totally closed, and at the same time, a multi-stage injection and an early injection is executed in the fuel injection into cylinders and the torque control of the torque generation of the diesel engine by an intake control to reduce the torque variation during the transition from the normal control operation to the catalyst activation control operation, is executed..."

In contrast to the assertions in the Office Action, it is respectfully submitted that the "step 28 with < LAMBDA RICH answer and step 29" does not execute the control by "the catalyst activation control operation means" in Pott '142. To the contrary, in Pott '142 in the "second set of operation condition (step 27)," when the exhaust gas becomes rich, the control goes to step 29, counts the period of rich condition, and makes a judgment as to whether or not the regeneration is terminated. See Pott '142, 12:4-12:19.

While Pott '142 discloses in 6:55-6:58 that the quantity of recirculated gas is reduced during a change from the first operating condition to the second operation condition, it contains no reference to the control by the "catalyst activation control operation means."

To the contrary, it is clearly shown in Figure 4 of Pott '142 that when the "THROTTLE VALVE POSITION" is at 90° and 5°, the "ENGINE OUTPUT" is constant and that when it is between 90° and 5°, the "ENGINE OUTPUT" undergoes changes. In greater detail, between the change from one to the other of the "normal control operation" and the "rich-burn control operation (not the catalyst activation control operation) (0sec-0.2sec, 3sec-3.3sec), the "ENGINE OUTPUT" changes. Also, the "intake control (8)", too, is merely such a control as to bring the "THROTTLE VALVE POSITION to 90° or 5°. See Pott '142, 13:39-13:55.

Claim 6 further recites: "...in the course of said catalyst activation control operation, a burning control operation in the vicinity of the stoichiometric air/fuel ratio in the range of 0.8 to 1.1 in terms of an excess fuel factor is performed in the condition of the EGR valve being totally closed..." The Office Action notes that Pott '142 does not discuss this feature of claim 6. Instead, the Office Action relies on Pott '064 to show this feature of claim 6.

However, Pott '064, referring specifically to 4:1-4:7, does not show that fuel is injected in a multi-stage injection with an early injection nor that at the stoichiometric air-fuel ratio, the air-fuel ratio of the engine oscillates. It is respectfully submitted that it is considered obvious to a person with ordinary skill in the art that conditions required for release of NOx and those required for release of SOx differ from each other, and that particularly on account of difference in temperature, operations required for removal of NOx and those required for the removal of SOx direr from each other. This statement is supported in the Office Action itself, and further in there is a supporting disclosure in Pott '142, 9:26-9:34.

Still further, in both Pott '064 and Ito, "desulfurization" and "NOx regeneration" are described as different operations from each other. In Pott '064, 2:11-2:17 and 3:64-4:7, it is clearly discussed that "NOx regeneration is performed first before process for raising the catalyst temperature is initialed" and that the "NOx regeneration is carried out at $\lambda < 1$." Consequently, it cannot be said that it is obvious to a person skilled in the art to apply the "desulfurization" operation of Pott '064 to the "Ox regeneration" operation of Pott '142 as noted in the Office Action.

In Pott '064, 4:23-4:25, it is disclosed that similar to NOx regeneration, in the catalyst temperature-raising procedure there is performed for example intake air throttling, EGR

increase, re-injection or charge reduction. In the "catalyst temperature-raising procedure" of Pott '064, an EGR increase is made, which differs from "in the condition of an EGR valve being totally closed" in the present invention as recited in claim 6.

Claim 6 further recites: "...wherein regeneration control is performed, to thereby purge or release NOx from a NOx occlusion reduction type catalyst." The Office Action relies on Ito to show this feature of claim 6. Referring to Ito, in each of Figure 18 and Figure 21 of Itoh and the accompanying text at 15:47-15:49 and 16:66-16:67 of Itoh, it is shown that when NOx is released, EGR control valve is completely closed. By contrast, claim 6 recites that "while EGR valve is totally closed during operation of the catalyst activation control operation means before releasing of NOx," "the operation of the rich-burn control means (NOx releasing operation) accompanies EGR". Accordingly, it is respectfully submitted that Ito does not disclose the above mentioned feature of claim 6.

Claims 1 and 13 contain similar features to claim 6 and it is respectfully submitted that claims 1, 6 and 13 patentably distinguish over the relied upon references for the foregoing reasons.

Withdrawal of the foregoing rejections is requested.

Claims 5 and 10

Claim 5 recites: "...said rich-burn control operation means recirculates EGR gas for generating an exhaust gas which is in a fuel-rich state and controls the torque generation of the diesel engine by an intake control of the diesel engine to reduce the torque variation during the transition from catalyst activation control operation to the rich-burn control operation or from the rich-burn control operation to the normal control operation."

Claim 10 recites: "...which comprises performing said rich-burn control operation to recirculate EGR gas to generate an exhaust gas which is in a fuel-rich state and to control the torque generation of the diesel engine by an intake control of the diesel engine to reduce the torque variation during the transition from catalyst activation control operation to the rich-burn control operation or from the rich-burn control operation to the normal control operation."

The Office Action relies on the modified system and method of Pott '142 to reject claims 5 and 10.

However, it is respectfully submitted that, as earlier noted, Figure 4 of Pott '142 clearly shows that when the THROITLE VALVE POSITION is at 90° and 5°, the ENGINE OUTPUT is

constant, and when it is between 90° and 5°, the ENGINE OUTPUT varies. Namely, during a change between "the normal control operation" and "the rich-burn control operation (not the catalyst activation control operation) (0sec-0.2sec, 3sec-3.3sec), the ENGINE OUTPUT undergoes changes. Also, the 'intake control (8)", too, is merely such a control as to bring the "THROTTLE VALVE POSITION" to 90° or 5°. See Pott '142, 13:39-13:55.

Therefore, Pott '142 does not show such an engine intake control according to claims 5 and 10 which reduces the torque variation during transition between respective controls. Further, claims 5 and 10 are believed to be allowable also because of their dependence on claims 1 and 6, respectively.

Claims 3 and 8

Claim 3 recites: "...said NO_x occlusion reduction type catalyst comprises a reducer occluding substance."

Claim 8 recites:"... said NO_x occlusion reduction type catalyst comprises a reducer occluding substance."

The Office Action relies on Yokota to show this feature of claims 3 and 8. Figure 3 of Yokota shows that in the carrying out of NOx purging from a NOx catalyst, the following controls are made: When NOx is released, control to operate a ONE-TIME injection and control EGR to be ON under a HIGH air-fuel ratio when T1=0-TO; when Ti=T10-T11 (during NOx releasing), control to operate TIME-SPLIT INJECTION and control EGR to be ON under a LOW fuel-ratio; and when, Ti=T11 (after release of N0x), control to operate TIME-SPLIT injection and control to bring EGR to REDUCE (or CUTOFF) under a LOW air-fuel ratio.

Accordingly, none of the above controls of Yokota corresponds to the controls defined in or by claims 1, 6 and 13, namely the control to totally close the EOR valve by the catalyst activation control operation means executing rich-burning (before NOx releasing), the EGR valve control (in rich-burn) by the rich-burn control operation means, and the multi-injection control with an early injection by the catalyst activation control operation means.

Although Yokota shows an outer-side layer made of zeolite, it contains no reference to occlusion of reducing substance.

Further, it is further noted that this deficiency in Yokota is not cured by Pott '142, Pott '064 or Ito, as none of these references contain a disclosure concerning either the use of zeolite in or for NOx occlusion-reduction type catalyst or the occlusion of reducing substance. It is

further respectfully submitted that it is not true either that it is generally put to practice to use zeolite in or for NOx occlusion-reduction type catalysts. Also, it is not true again that in Yokota zeolite is put to use consciously of the effect of absorption of reducing substance brought about through the use of zeolite.

Withdrawal of the foregoing rejections is requested.

CONCLUSION

Regarding Pott '142, Pott '064, Ito and Yokota, these references do discuss raising the exhaust-gas temperature in SOx purge control where raising of exhaust-gas temperature is required because SOx is released at a relatively high temperature. However, none of the relied upon references carries out raising of the exahust-gas temperature in or for the carrying out of NOx purge as in the present invention. For example, Figure 4 of Pott '142 does not show that exhaust-gas temperature-raising is carried out. In Pott '064, it is stated in 2:18-2:22, that NOx regeneration is first performed before a catalyst temperature raising procedure is initiated. In Figure 21 of Ito it is shown that the temperature raising control (300) is performed when the SOx RELEASING FLAG SET is YES, and it is not performed when NOx RELEASING FLAG SET is YES. In other words, it is not shown in Ito that in the NOx releasing, a control is done corresponding to the one done by "the catalyst activation control operation means".

In contrast to the above, according to the present invention, EGR is carried out in the rich-burning for NOx regeneration (NOx release), whereby saving of fuel consumption can be attained, and to avoid problems attributable to the carrying out of EGR (such as a lowering of the exhaust-gas temperature, increase of inactive gas on the catalyst surfaces, and inactivation of catalyst), a catalyst activation control is performed before the above rich-burning. As a result of the above, the catalyst surface-temperature can be elevated and activation of the catalyst can be made, so that even if rich-burn with EGR is carried out, a satisfactory reduction and purge of NOx released from the NOx occlusion-reduction type catalyst can be brought about and a high NOx purging performance can be attained.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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